P. STIRN.

CLEANING APPARATUS.

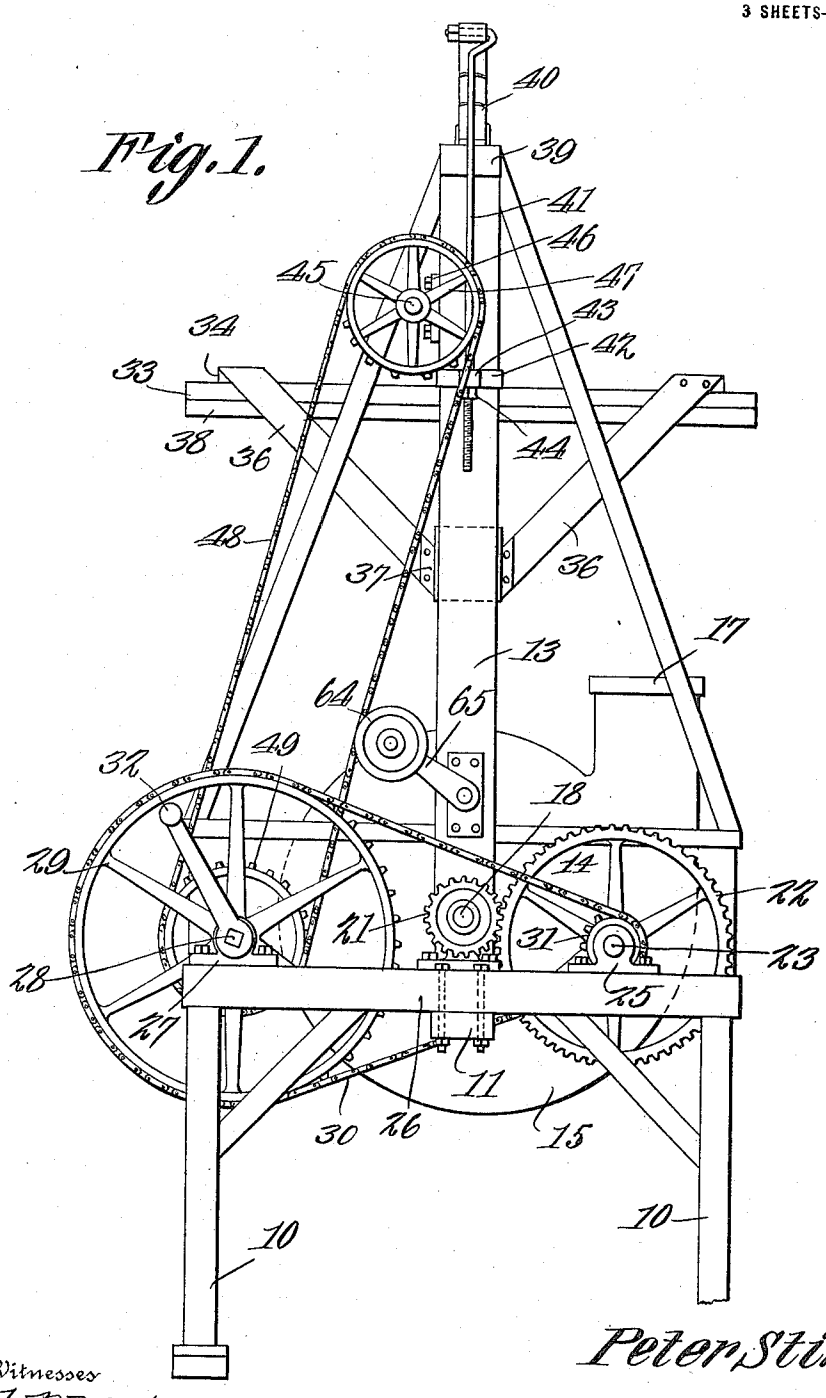
APPLICATION FILED OCT. 4, 1915.

1,176,995.

Patented Mar. 28, 1916.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 2.

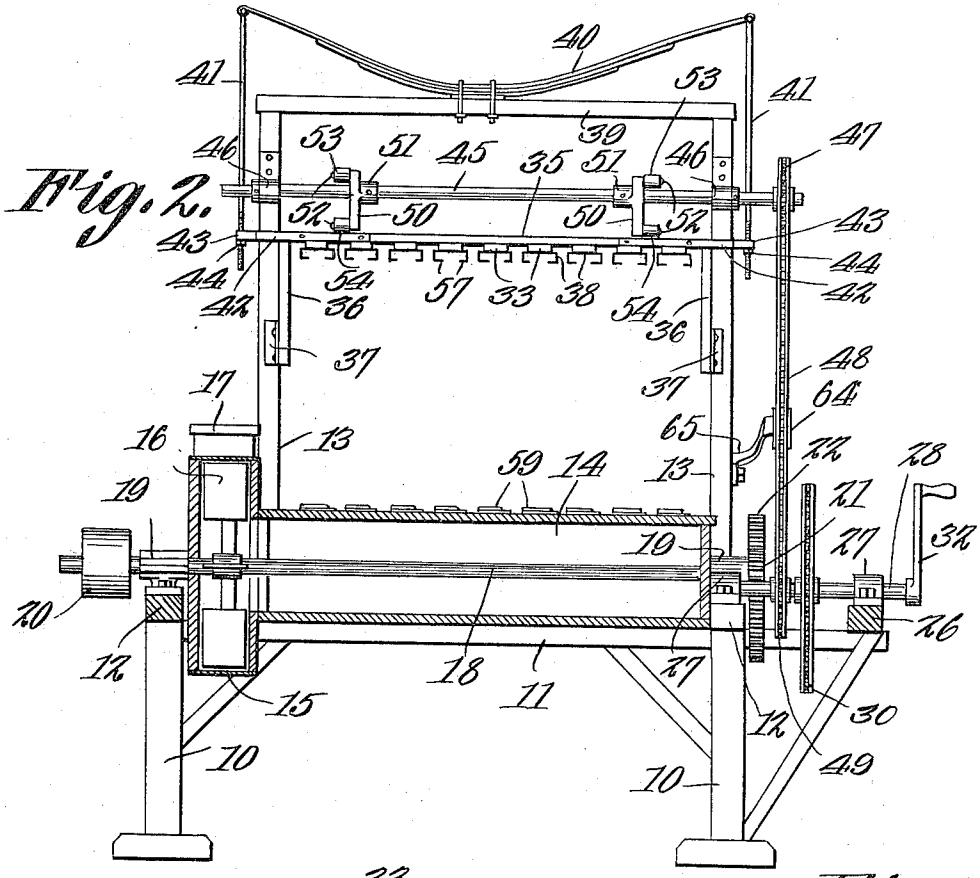
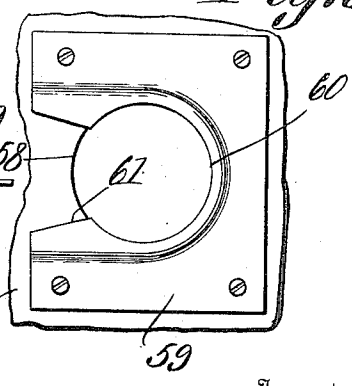


Fig. 6.



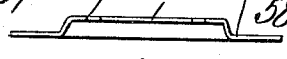


Fig. 7.

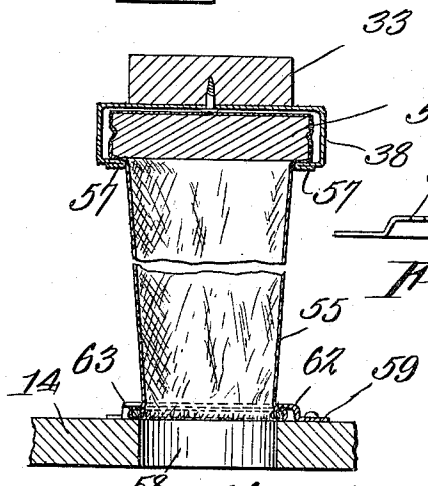


Fig. 5.

Witnesses

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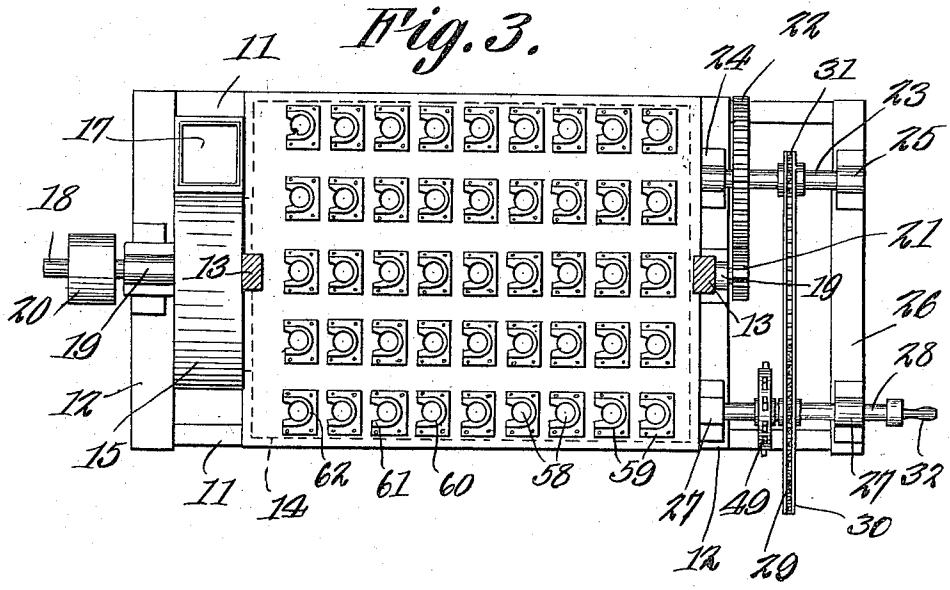
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3 SHEETS—SHEET 3.

Fig. 3.



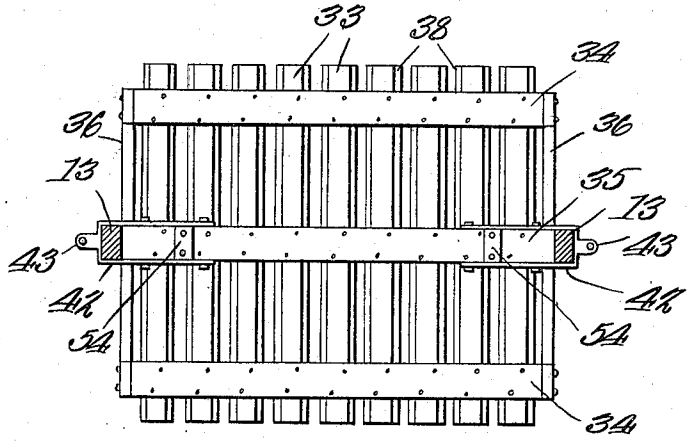


Fig. 4.

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UNITED STATES PATENT OFFICE.

PETER STIRN, OF LITTLE FALLS, MINNESOTA.

CLEANING APPARATUS.

1,176,995. Specification of Letters Patent. Patented Mar. 28, 1916.

Application filed October 4, 1915. Serial No. 53,971.

To all whom it may concern:

Be it known that I, PETER STIRN, a citizen of the United States, residing at Little Falls, in the county of Morrison and State of Minnesota, have invented certain new and useful Improvements in Cleaning Apparatus, of which the following is a specification.

The machine which is the subject matter of the present application for patent is designed for cleaning the dust bags of dust-collecting apparatus used in flouring mills. These bags or receptacles, commonly termed "stockings," soon become clogged with dust when in use, and it then becomes necessary to take the same out of the apparatus in order that the accumulated dust may be removed. This is usually done by shaking the bags by hand, a very tedious and dusty operation, and incomplete at the best.

The present invention therefore has for its object to provide a novel and improved machine for effecting the removal of the accumulated dust from the bags, thus doing away with the unsanitary and unsatisfactory hand cleaning process.

The invention also has for its object to provide a machine of the character described, which is rapid and highly efficient in operation, simple and inexpensive, and which can be operated and maintained at a low cost.

In order that the invention may be better understood, reference is had to the accompanying drawings, in which—

Figure 1 is an end elevation of the machine; Fig. 2 is a front elevation thereof, partly in section; Fig. 3 is a plan view of the lower portion of the machine; Fig. 4 is a plan view of the upper portion of the machine; Fig. 5 is a sectional detail showing the holding means of the bags; Fig. 6 is a plan view of one of the holding devices of the bottom of the bag, and Fig. 7 is an edge view of said device.

Referring specifically to the drawings, the supporting stand of the machine comprises legs 10, longitudinal beams 11 and cross beams 12, all suitably connected and braced in any approved manner. From the cross beams 12, on each end of the stand, rise standards 13 serving as guides for an agitator to be presently described. The stand also supports a suction box 14 connected at one end to the inlet of a fan casing 15 in which works a rotary fan 16. The outlet of the fan casing is shown at 17. The fan is on a shaft 18 passing lengthwise through the suction box, and supported at its ends in bearings 19 on the cross beams 12.

On one end of the fan shaft 18 is a drive pulley 20, and on the other end of said shaft is a pinion 21 meshing with a spur gear 22 on a countershaft 23 supported in a bearing 24 on the cross beam 12 at one side of the machine, and a bearing 25 on a cross beam 26 extending parallel to said cross beam 12 and suitably supported by the stand. The cross beams 12 and 26 last mentioned also carry bearings 27 for a shaft 28 having a large sprocket wheel 29 which is connected by a chain 30 to a small sprocket wheel 31 on the countershaft. The shaft 28 is fitted with a crank handle 32 for turning the same. The fan may therefore be operated manually by means of the crank handle; or it may be power-driven by belting the pulley 20 to a suitable source of power.

Between the standards 13, above the suction box 14, is mounted a vertically reciprocatory cross head, composed of a series of slats 33 connected in laterally spaced, parallel relation, by end cross bars 34 and an intermediate cross bar 35. To each end of the end bars 34 are secured depending and converging bars 36 carrying at their lower ends a guide shoe 37 slidably mounted on the adjacent standard 13. On the under side of the slats 33 are rigidly mounted channel bars 38, one on each slat, and extending in the direction of the length thereof. Above the cross head, the standards 13 are connected by a cross beam 39, on top of which latter is secured, midway between its ends, an elliptic spring 40 having attached to its free ends depending rods 41. The ends of the cross bar 35 carry guides 42 shaped to straddle the standards 13 and having perforated ears 43 for connection of the rods 41, the latter passing through the ears and being secured by nuts 44 abutting against the under side of the ears. The rods 41 are threaded to receive the nuts 44, and the latter also serve as a means for adjusting the tension of the spring 40.

Above the cross head are located tappets for forcing the same downward against the tension of the spring 40. These tappets are mounted on a shaft 45 supported in bearings 46 on the standards 13, and having a sprocket wheel 47 which is connected by a chain 48 to a sprocket wheel 49 on the shaft 28. Two sets of tappets are provided,

each comprising arms 50 radiating from a hub 51 made fast on the shaft 45. The outer end of each tappet arm carries a lateral pin 52 on which is mounted a roller 53. When the shaft 45 is in motion, the rollers 53 successively strike a cushion block 54 on the cross bar 35, and force the cross head downward against the tension of the spring 40, and as each roller clears the cushion block, the spring draws the cross head back with a sudden jerk, thus shaking the dust out of the bags carried by the cross head as will be presently described. The blocks 54 are of wood, and leather faced.

The bags to be cleaned are shown at 55. As shown, the bags are suspended in inverted position from the cross head, their upper ends being secured in the channels of the bars 38. A wooden block 56 is inserted in the bottom of the bag and the bag is then inverted, and the upper end containing the block is slid into the channel of one of the bars 38. The sides of the channel have inturned flanges 57 to hold the block. The mouth of the bag is now at the bottom, and this end is secured by a clip over an aperture 58 in the top of the suction box 14. This clip comprises a sheet metal plate 59 suitably secured on top of the suction box, over the aperture 58, and having a circular opening 60 in line with said aperture. From this opening a flared slot 61 extends to and opens through the edge of the plate. Adjacent to the opening 60 and the slot 61, the plate has a raised portion 62 which is spaced from the top of the suction box. The mouth of the bag 55 is provided with a ring 63 for holding the same open. This portion of the bag is slipped under the raised portion 62 of the clip plate, by passing the lower end of the bag along the slot 61 and into the opening 60. The bag is now held at both ends, with the mouth over the aperture 58. The suction box 14 has a large number of apertures 58 and clips 59, and the channel bars 38 accommodate a large number of bags, to give the machine a maximum capacity. The contracted inner end of the slot 61 prevents the bag from accidentally slipping out of the opening 60.

In operation, the bags being suspended from the cross head and secured at their lower ends as described, the shaft 28 is put in motion, whereupon the cross head is alternately forced down by the tappets and up by the spring as already described, and the fan 16 is also operated to exhaust the box 14. The bags are thus jarred or shaken, and the dust is sucked into the box 14 by the fan and delivered into a suitable receptacle. The agitation of the bags jars the dust loose, and the bags are thoroughly and rapidly relieved of all dust and dirt. A few strokes up and down the bags with a brush completes the operation.

The machine is inexpensive, rapid in operation, and it effectually serves the purpose for which it is designed, all the dust and litter in a mill, caused by the hand cleaning process, being eliminated. The machine will also clean torn or worn bags so that the same may be repaired, and it is simple and easily operated, and the bags can be readily mounted for the cleaning operation, and removed from the machine.

The machine can be adjusted for bags of different lengths by raising or lowering the tappet shaft 45 and by a corresponding adjustment of the connection between the spring and the cross head. The sizes of the dust inlets of the suction box and the clips will depend on the diameter of the bags, the same being readily varied to suit all sizes of bags. A tightener sprocket wheel 64 is provided for the chain 48, the same being carried by an arm 65 mounted on one of the standards 13.

I claim:

1. A machine for cleaning the dust bags of dust-collecting apparatus, comprising a suction box having inlet apertures, a reciprocatory bag support, means for suspending the bags from said support in inverted position, means for securing the mouths of the bags over the inlet apertures, means for reciprocating the bag support to jar the bags, a fan for the suction box, and a drive shaft operatively connected to the fan and to the aforesaid reciprocating means.

2. A machine for cleaning the dust bags of dust-collecting apparatus, comprising a suction box having inlet apertures, a reciprocatory bag support, channel bars on the bottom of said support, means for clamping the bottoms of the bags in the channels of said bars, the bags being suspended from the channel bars in inverted position, means for securing the mouths of the bags over the inlet apertures, and means for reciprocating the bag support to jar the bags.

3. A machine for cleaning the dust bags of dust-collecting apparatus, comprising a suction box having inlet apertures, a reciprocatory bag support, means for suspending the bags from said support in inverted position, clip plates mounted on the suction box and having raised portions which are spaced from the box, said raised portions having openings in line with the inlet apertures and slots leading from said openings to the edges of the plates, the mouths of the bags extending into the openings and being held under the raised portions of the clip plates, and means for reciprocating the bag support to jar the bags.

4. A machine for cleaning the dust bags of dust-collecting apparatus, comprising a suction box having inlet apertures, a reciprocatory bag support, channel bars on the bottom of said support, means for clamping

the bottoms of the bags in the channels of said bars, the bags being suspended from the channel bars in inverted position, clip plates mounted on the suction box and having raised portions which are spaced from the box, said raised portions having openings in line with the inlet apertures and slots leading from said openings to the edges of the plates, the mouths of the bags extending into the openings and being held under the raised portions of the clip plates, and means for reciprocating the bag support to jar the bags.

5. A machine for cleaning the dust bags of dust-collecting apparatus, comprising a suction box having inlet apertures, a reciprocatory bag support, means for suspending the bags from said support in inverted position, means for securing the mouths of the bags over the inlet apertures, tappets engageable with the bag support to force the same in one direction, a spring for returning the bag support, a fan for the suction box, and a drive shaft operatively connected to the fan and to the tappets.

6. A machine for cleaning the dust bags of dust-collecting apparatus, comprising a suction box having inlet apertures, a reciprocatory bag support, means for suspending the bags from said support in inverted position, means for securing the mouths of the bags over the inlet apertures, tappets engageable with the bag support to force the same in one direction, a spring for returning the bag support, a shaft carrying the tappets, a drive shaft operatively connected to the tappet shaft, a countershaft driven by the drive shaft, and a fan for the suction box having its shaft geared to the countershaft.

7. A machine for cleaning the dust bags of dust-collecting apparatus, comprising a supporting stand, laterally spaced stationary standards rising therefrom, a stationary suction box supported by the stand at the bottom of the standards and having inlet apertures, a reciprocatory cross head mounted between the standards above the suction box, guides on the cross head engaging the standards, bag suspension means on the under side of the cross head, means for securing the mouths of the bags over the inlet apertures of the suction box, and means for reciprocating the cross head to jar the bags.

8. A machine for cleaning the dust bags of dust-collecting apparatus, comprising a suction box having inlet apertures, a reciprocatory cross head working above the suction box, a single means for securing a plurality of bags in pendent and inverted position on the under side of the cross head, means for securing the mouths of the bags over the inlet apertures of the suction box, and means for reciprocating the cross head to jar the bags.

9. A machine for cleaning the dust bags of dust-collecting apparatus, comprising laterally spaced standards, a cross beam connecting the standards at the top, a leaf spring fixed intermediate its ends on the cross beam and projecting at its ends beyond the standards, a reciprocatory cross head carried by the standards beneath the cross beam, a connection between the cross head and the ends of the spring, a suction box beneath the cross head, said box having inlets, means for suspending the bags from the bottom of the cross head in inverted position, means for securing the mouths of the bags to the inlets of the suction box, and tappets engageable with the cross head.

In testimony whereof I affix my signature in the presence of two witnesses.

PETER STIRN.

Witnesses:
JOHN VERTIN,
ESTHER TRETTEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."